

REMARKS

By the present amendment, claims 3, 23, 25, 26, 30, and 33-35 have been amended to obviate the examiner's objections thereto and/or to further clarify the concepts of the present invention. Entry of these amendments is respectfully requested.

In the Office Action, claims 1-36 were rejected under the second paragraph of 35 USC § 112 as being indefinite. Specifically, various terms and phrases were identified which are alleged to be improper. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

As mentioned above, claims 3, 23, 25, 26, 30 and 33-35 have been amended to obviate the examiner's objections thereof. It is submitted that the claims are now in conformance with the provisions of the cited statute. Accordingly, withdrawal of the rejection under the second paragraph of 35 U.S.C. § 112 is respectfully requested.

Claims 1-36 were rejected under 35 USC § 103(a) as being unpatentable over the patent to Kawagoe et al in view of the patent to Terada et al. In making this rejection, it basically was asserted that the cited Kawagoe et al patent teaches flame-sprayed copper

based compositions with ranges for disclosed components overlapping those as claimed. Further, it was alleged that each cited patent teaches to selectively melt or unmelt alloying elements. However, it was acknowledged that the Kawagoe et al patent does not teach feeding the copper and the aluminum separately, but it was alleged that the Terada et al patent supplies this deficiency since it teaches use of mixtures of particles for flame spraying. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

It is submitted that the cited patents to Kawagoe et al and Terada et al, whether taken singly or in combination, do not teach or suggest the presently claimed invention. The Kawagoe et al patent teaches a swash plate having a flame sprayed layer of copper-based alloy which contains 0.5 to 50% of one or more of not more than 40% of lead, not more than 30% of tin, not more than 0.5 of phosphorous, not more than 15% aluminum, not more than 10% of silver, not more than 5% of silicon, nor more than 5% of manganese, not more than 5% of chromium, not more than 20% of nickel, and not more than 30% of zinc.

The Terada et al patent teaches a brazable aluminum material composed of an aluminum core and a brazing agent layer consisting of a brazing agent thermally sprayed onto and covering a surface of the core. A number of unmolten minute particles of the brazing agent are present in the brazing agent layer, and which contain at least an aluminum-silicon alloy and/or a mixture of aluminum and silicon.

In response to the rejection, it is submitted that the basis for the combination of the teachings of the two patent is erroneous. In simplified form, it was contended that the Kawagoe et al patent teaches flame spraying of a copper and aluminum alloy where a portion is melted and a portion is not melted. Then, substituted in this teaching were the teachings of the Terada et al patent that a feed to a flame spraying operation can be elemental copper and aluminum. Hence, in accordance with the Kawagoe et al patent, the resultant flame sprayed material, according to the reasoning of the rejection, would have copper as an unmelted phase as well as copper as a melted phase along with aluminum as an unmelted phase as well as aluminum as a melted phase thereby allegedly meeting the conditions of independent claims 1 and 30.

In response to the rejection, it is submitted that one of ordinary skill in the art would not employ the teachings of the Terada et al patent in the method as disclosed in the Kawagoe et al patent. In particular, the Kawagoe et al patent teaches that the first fine copper powder is melted and the second coarse copper-lead powder is not melted. On the other hand, the Terada et al patent teaches that the surface and core of the aluminum-silicon powder are melted and remain solid, respectively.

Thus, it must be emphasized in support of the patentability of the subject invention over the teachings of the cited patents is that these patents provides no suggestion to motivate one of ordinary skill in the art to combine their teachings in the manner proposed by the examiner. It is well established principle of U.S. patent practice that the prior art must contain some suggestion for combination since without such, any combination is pure speculation on the part of the examiner and is based on a prohibited hindsight reconstruction from applicants' own disclosure.

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For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 1 through 36 as amended over the cited patents are respectfully requested.

The drawings were objected to as containing legends which are not in English. Accompanying this Amendment are formal drawings where all the legends are in English. Withdrawal of the objection is therefore requested.

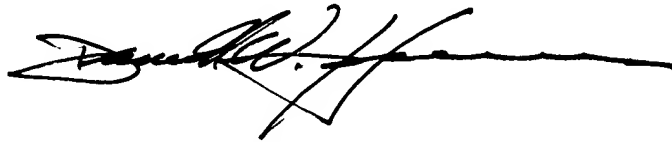
In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

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In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

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Marked Up Version of Amendments to the Claims

3. (Twice Amended) A flame-sprayed copper-aluminum composite material according to claim 2, wherein said first aluminum alloy comprises a second aluminum alloy, which is formed by incorporating said copper or a component of the first copper alloy into the first aluminum alloy, by ~~to~~ flame-spraying.

23. (Twice Amended) A flame-sprayed copper-aluminum composite material according to claim 3, wherein at least a portion of said first copper alloy₁ (except for the second copper alloy₁) consists of Cu crystals, and at least a portion of said first aluminum alloy₁ (except for the second aluminum alloy₁) consists of Al crystals.

25. (Twice Amended) A flame-sprayed copper-aluminum composite material according to claim 1, characterized by further containing 30% by weight or less of one or more selected from the group consisting of Al_2O_3 , SiO_2 , SiC, ZrO_2 , Si_3N_4 , BN, AlN, TiN, TiC, B_4C , ~~as well as~~ iron-phosphorus compounds, iron-boron compounds, and iron-nitrogen compounds.

26. (Twice Amended) A flame-sprayed copper-aluminum composite material according to claim 1, wherein it is laminated on a substrate and is coated with a soft metal layer which is softer than the substrate.

30. (Amended) A method for producing a copper-aluminum composite material, ~~characterized in that~~ comprising flame-spraying material containing powder of copper or copper alloy and powder of aluminum or aluminum alloy ~~are flame-sprayed in such a manner~~ that a portion of these powders is melted and a portion is not melted.

33. (Amended) A method for producing a copper-aluminum composite material according to claim 30 or 31, ~~characterized by further flame spraying~~ wherein 30% by weight or less of graphite powder is mixed with the material prior to flame-spraying.

34. (Twice Amended) A method for producing a copper-aluminum composite material according to claim 30 or 31, ~~characterized by further flame spraying~~ wherein 30% by weight or less of one or more selected from the group consisting of Al_2O_3 , SiO_2 , SiC ,

ZrO₂, Si₃N₄, BN, AlN, TiN, TiC, B₄C, ~~as well as~~ iron-phosphorus compounds, iron-boron compounds, and iron-nitrogen compounds is mixed with the material prior to flame-spraying.

35. (Amended) A method for producing a copper-aluminum composite material according to claim 30 or 31, wherein the flame spraying is carried out on a ~~roughened~~ surface of a metallic substrate, the surface of the metallic substrate having been roughened to Rz 10-60 μm prior to flame spraying.